

Application Number **10/799,335**  
Amendment dated **16 October 2006**  
Reply to Office Action of **22 June 2006**

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**Amendments to the Claims**

This listing of claims will replace all prior versions, and listings, of claims in the application:

Claim 1 (original): A method for blanket depositing a SiGe film comprising:

intermixing a silicon source, a germanium source and an etchant to form a gaseous precursor mixture;

flowing the gaseous precursor mixture over a substrate under chemical vapor deposition conditions; and

depositing a blanket layer of epitaxial SiGe over the substrate, the epitaxial SiGe formed from at least some of the components of the gaseous precursor mixture.

Claim 2 (original): The method of claim 1, wherein an underlying blanket layer is positioned over the substrate, such that the blanket layer of epitaxial SiGe is deposited over the underlying blanket layer.

Claim 3 (original): The method of claim 1, wherein the substrate is patterned with windows of single crystal material framed by a dielectric material.

Claim 4 (original): The method of claim 1, wherein the substrate is patterned with windows of single crystal material framed by a dielectric material, wherein the dielectric material is an oxide.

Claim 5 (original): The method of claim 1, wherein the substrate is patterned with windows of single crystal material within a dielectric material, wherein the dielectric material is a nitride.

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Claim 6 (original): The method of claim 1, wherein the substrate is patterned with a shallow trench isolation scheme.

Claim 7 (original): The method of claim 1, wherein the blanket layer of epitaxial SiGe has a surface roughness of less than approximately 40 Å rms.

Claim 8 (original): The method of claim 1, wherein the blanket layer of epitaxial SiGe has a surface roughness of less than approximately 20 Å rms.

Claim 9 (original): The method of claim 1, wherein the substrate comprises a bare single crystal silicon substrate.

Claim 10 (original): The method of claim 1, wherein the epitaxial SiGe film has a greater silicon content at the interface with the substrate than at other points in the film.

Claim 11 (original): The method of claim 1, wherein the silicon source is selected from the group consisting of silane, disilane, trisilane, chlorosilane, dichlorosilane, trichlorosilane, and tetrachlorosilane.

Claim 12 (original): The method of claim 1, wherein the germanium source is selected from the group consisting of germane, digermane, trigermane, chlorogermane, dichlorogermane, trichlorogermane, and tetrachlorogermane.

Claim 13 (original): The method of claim 1, wherein the etchant comprises hydrogen chloride,

Claim 14 (original): The method of claim 1, wherein the etchant is present in an amount that is less than the combined amounts of the silicon source and the germanium source, on a weight basis.

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Claim 15 (original): The method of claim 1, wherein the blanket layer of epitaxial SiGe has a greater degree of planarity as compared to a reference blanket layer of epitaxial SiGe deposited under comparable conditions, except in the absence of the etchant.

Claim 16 (original): The method of claim 1, wherein the blanket layer of epitaxial SiGe has a reduced density of defects as compared to a reference blanket layer of epitaxial SiGe deposited under comparable conditions, except in the absence of the etchant.

Claim 17 (original): The method of claim 1, wherein the blanket layer of epitaxial SiGe has an etch pit density of less than  $10^7$  defects  $\text{cm}^{-2}$ .

Claim 18 (original): The method of claim 1, wherein the blanket layer of epitaxial SiGe has an etch pit density of less than  $10^5$  defects  $\text{cm}^{-2}$ .

Claim 19 (currently amended): A method comprising:

- providing a single crystal silicon substrate in a chemical vapor deposition chamber;

- supplying a mass of silicon precursor into the chamber;

- supplying a mass of germanium precursor into the chamber;

- supplying a mass of etchant into the chamber, wherein the mass of etchant supplied is less than the mass of silicon precursor and the mass of germanium precursor, combined; and

- depositing a blanket SiGe film over the substrate.

Claim 20 (cancelled).

Claim 21 (original): The method of claim 19, wherein the substrate is a bare wafer.

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Claim 22 (original): The method of claim 19, wherein the substrate is patterned with windows of single crystal material with a dielectric material.

Claim 23 (original): The method of claim 19, wherein the substrate is a wafer having a first blanket layer deposited thereover, and wherein the SiGe film is deposited as a second blanket layer over the first blanket layer.

Claim 24 (original): The method of claim 19, wherein the chemical vapor deposition chamber is a single wafer chamber.

Claim 25 (original): The method of claim 19, wherein the SiGe film has a greater silicon content at the interface with the substrate than at other points in the film.

Claim 26 (original): The method of claim 19, wherein the silicon precursor is selected from the group consisting of silane, disilane, trisilane, chlorosilane, dichlorosilane, trichlorosilane, and tetrachlorosilane.

Claim 27 (original): The method of claim 19, wherein the germanium source is selected from the group consisting of germane, digermane, trigermane, chlorogermane, dichlorogermane, trichlorogermane, and tetrachlorogermane.

Claim 28 (original): The method of claim 19, wherein the etchant comprises hydrogen chloride.

Claim 29 (original): The method of claim 19, wherein the germanium content of the blanket SiGe film is between approximately 20% and approximately 100%.

Claim 30 (original): The method of claim 19, wherein the germanium content of the SiGe film is between approximately 40% and approximately 80%.

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Claim 31 (original): The method of claim 19, wherein the etchant is supplied into the chamber at a rate between approximately 25 sccm and 50 sccm.

Claim 32 (original): The method of claim 19, wherein the chamber has a temperature between approximately 350°C and approximately 1100°C during deposition of the SiGe film.

Claim 33 (original): The method of claim 19, wherein the chamber has a temperature between approximately 800°C and approximately 900°C during deposition of the SiGe film.

Claim 34 (original): The method of claim 19, wherein the chamber has a pressure between approximately 0.200 Torr and approximately 850 Torr during deposition of the SiGe film.

Claim 35 (original): The method of claim 19, wherein the chamber has a pressure between approximately 1 Torr and approximately 100 Torr during deposition of the SiGe film.

Claim 36 (original): The method of claim 19, wherein the SiGe film has a surface roughness of less than approximately 40 Å rms.

Claim 37 (original): The method of claim 19, wherein the SiGe film has a surface roughness of less than approximately 30 Å rms.

Claim 38 (original): The method of claim 19, wherein the SiGe film has a surface roughness of less than approximately 20 Å rms.

Claim 39 (original): A method of blanket depositing a SiGe film comprising:

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intermixing a silicon source gas and a germanium source gas;  
adding an etchant to the intermixed source gases to form a gaseous precursor mixture;  
flowing the gaseous precursor mixture over a substrate under chemical vapor deposition conditions; and  
depositing a blanket layer of epitaxial SiGe onto the substrate;  
wherein the mass of etchant added to the intermixed source gases is less than a mass of etchant added to the intermixed source gases in a selective deposition process.

Claim 40 (original): The method of claim 39, wherein the mass of etchant added to the intermixed source gases is less than the mass of the intermixed source gases.

Claim 41 (original): The method of claim 39, wherein the substrate is positioned within a chemical vapor deposition chamber.

Claim 42 (original): The method of claim 39, wherein the substrate is positioned within a chemical vapor deposition chamber, and wherein the etchant is supplied to the chamber at between approximately 1 sccm and approximately 200 sccm.

Claim 43 (original): The method of claim 39, wherein the substrate is positioned within a chemical vapor deposition chamber, and wherein the etchant is supplied to the chamber at between approximately 25 sccm and approximately 50 sccm.

Claim 44 (currently amended): A method of blanket depositing a film comprising:  
providing a single crystal substrate in a chemical vapor deposition chamber;  
supplying a mass of germanium source gas into the chamber;  
supplying a mass of etchant into the chamber, wherein the mass of etchant supplied is less than the mass of germanium source gas; and

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blanket depositing a film over the single crystal substrate, wherein the film comprises germanium.

Claim 45 (original): The method of claim 44, wherein the germanium content of the film is between approximately 20% and approximately 100%.

Claim 46 (original): The method of claim 44, wherein the film has a surface roughness of less than approximately 40 Å rms.

Claim 47 (original): The method of claim 44, wherein the film has a surface roughness of less than approximately 20 Å rms.

Claim 48 (original): The method of claim 44, wherein the film has an etch pit density of less than  $10^7$  defects  $\text{cm}^{-2}$ .

Claim 49 (original): The method of claim 44, wherein the film has an etch pit density of less than  $10^5$  defects  $\text{cm}^{-2}$ .

Claim 50 (original): The method of claim 44, wherein the film has a greater degree of planarity as compared to a reference film deposited under comparable conditions, except in the absence of the etchant.

Claim 51 (original): The method of claim 44, wherein the single crystal substrate is a bare wafer.

Claim 52 (original): The method of claim 44, wherein the single crystal substrate is patterned with windows of single crystal material with a dielectric constant.

Claim 53 (original): The method of claim 44, further comprising supplying a mass of silicon source gas into the chamber.